REMARKS

As noted previously, the Applicant appreciates the Examiner's thorough examination of the subject application.

Claims 1-20 and 34-42 are pending in the application and were rejected in the Office Action mailed 02 November 2007 on various statutory grounds, described in further detail below. Claims 21-33 have been withdrawn. Claims 1, 2, 5-12, 15, 17-22 and 34 are amended herein. Claims 9, 19, 36, and 38-42 are canceled by the present amendment. No new matter has been added.

Applicant requests reconsideration and further examination of the subject application in light of the foregoing amendments and the following remarks.

Drawings

The drawings were rejected under 37 CFR § 1.83(a), with the Examiner noting that the drawings must show every feature of the invention specified in the claims. More specifically, the Examiner stated:

> Therefore, the "stocking having an optical ingress"; "bacterial density below tissue coagulation density"; the selective emission under control of said first radiation"; the selective emission under control of said second radiation"; "the control configured and arranged to adjust power density"; "the control configured and arranged to adjust the power density by adjusting the spot size"; "the control configured and arranged to adjust the power density by scanning a beam spot"; and "power densities that will selectively excite the biomolecule electrons of chromophores" must be shown or the feature(s) canceled from the claim(s).

By the claim amendments submitted with this paper, claims 1 and 11 have been amended to clarify that the emission of the first and second wavelengths or wavelength ranges is under the control of the control system (and not that the first and second radiation control the emission). Further, claims 9, 19, 36, and 38-42 have been canceled, rendering the objections moot to the drawings relative to the elements recited in these claims.

Applicant submits that the amendments to the claims herein cure the objections to the drawings.

Claim Rejections – 35 U.S.C. § 112

Claims 1 and 22 – 35 U.S.C. § 112, ¶1

Claims 1 and 22 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner stated that:

> The originally filed disclosure is silent on "a stocking having an optical ingress"; "bacterial density below tissue coagulation density"; "the control configured and arranged to adjust the power density"; and "power densities that will selectively excite the biomolecule electrons of chromophores" and on the manner in which "the selective emission under control of said first radiation"; "the selective emission under control of said second radiation" occurs; and on the manner in which "the control configured and arranged to adjust the power density"; "the control configured and arranged to adjust the power density by adjusting the spot size"; "the control configured and arranged to adjust the power density by scanning a beam spot"; and "the transmission is configured and arranged for . . ." is implemented.

As noted previously regarding the objections to the drawings, claims 1 and 11 have been amended to clarify that the emission of the first and second wavelengths or wavelength ranges is under the control of the control system (and not that the first and second radiation control the emission). Claims 9, 19, 36, and 38-42 have been canceled, rendering the rejections of these claims as moot. Applicant submits that the amendments to the claims herein renders these rejections under 35 U.S.C. § 112, paragraph one, as moot.

Claims 1-20 and 34-42 – 35 U.S.C. § 112, ¶2

Claims 1-20 and 34-42 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

More particularly, the Examiner stated that in claims 1 and 11, the exact meaning of "the selective emission under control of said first radiation" is unclear. By the present amendment,

claims 1 and 11 have been amended to clarify that the emission of the first and second wavelengths or wavelength ranges is under the control of the control system (and not that the first and second radiation control the emission). Applicant submits that this amendment cures the rejection under 35 U.S.C. § 112, second paragraph.

In claims 2 and 4 and claims 12 and 14, it was unclear to the Examiner what the difference in scope of these claims is, specifically, multiplexing is discussed in the originally filed disclosure in the brief description of Figures 3a and 3b as frequency domain multiplexing, which multiplexing occurs when simultaneous transmission is used. Applicant notes that by the present amendment, claims 2 and 12 have been amended to include that the optical channel comprises two optical channels and that the simultaneous transmission occurs over the two optical channels. Applicant submits that this amendment cures the rejection under 35 U.S.C. § 112, second paragraph.

In claims 9 and 19, exactly what constitutes a "stocking" was stated by the Examiner as being unclear. The Examiner stated that for the purpose of examination, "stocking" will be construed to indicate any structure which surrounds, controls, or guides that laser beam path. Applicant notes that by the present amendment, claims 9 and 19 have been canceled rendering the rejection moot as to claims 9 and 19.

The Examiner stated further that claims 10 and 20 were indefinite as failing to further limit the claims from which they depend; exactly what structure is to be excluded by requiring a handle was unclear to the Examiner for, his argument alleged, since without an optical egress, the delivery of the radiation cannot proceed, and therefore what further limitation is intended to be implied is unclear. Applicant traverses this rejection as the plain meaning of handle is believed to be clear, especially in conjunction with the handles shown in the drawings. For example, a common definition of "handle" is "a part of a thing made specifically to be grasped or held by the hand." See handle. (n.d.). *Dictionary.com Unabridged (v 1.1)*. Retrieved November 20, 2007, from Dictionary.com website: http://dictionary.reference.com/browse/handle

Claim 34 was stated as being indefinite as the exact meaning of the term "without detrimental heat deposition or irreversible harm" was said to be unclear as (allegedly) no metes and bounds of this term are set forth in the originally filed disclosure, further the exact meaning of the term "the power density for absorption as non-ionizing without detrimental heat deposition or irreversible harm to the biological system" was said to be unclear. Claim 34 has been amended to delete the cited terms in the body of the claim, rendering the rejection as moot.

Claim 38 was stated as being indefinite for failing to further limit the claim from which it depends, as the generation of singlet oxygen is attributed to all wavelengths claimed in the independent claim, and therefore what further limitation is intended to be implied is unclear. Claim 39 was stated as being unclear, since exactly how "the transmission is configured and arranged for bacterial destruction with minimal heat deposition in the infected site . . ." is effected. Claim 40 was stated as being unclear, since exactly how "the transmission is configured and arranged for bacterial destruction based on Power Density of the incident beam . . ." is effected. Claim 41 was stated as being unclear, since exactly how "the transmission is configured and arranged for bacterial destruction based on Power Density of the incident beam . . ." is effected. Claim 42 was stated as being unclear with regard to the phrase "the transmission is configured and arranged for bacterial destruction at power densities that will selectively excite the biomolecule electrons of the chromophores." Specifically, with respect to claims 39-42, it is unclear how the "transmission" of the beam will be "configured and arranged" to effect the intended use recited thereafter. Additionally, the Examiner noted that with respect to claim 42, the terms "the biomolecule electrons" and "the chromophore" lack positive antecedent basis. As noted above, claims 38-42 have been canceled, rendering the rejections of these claims as moot.

Applicant submits that the amendments to the claims herein cure the rejections under 35 U.S.C. § 112, paragraph two.

Claim Rejections – 35 U.S.C. § 102

Claims 1, 9-11, 19, 20, 34, and 38-42 were rejected under 35 U.S.C. § 102(b) as being anticipated by international application WO 2000/01294 to Parker at al. ("Parker"). Applicant

traverses the rejection and requests reconsideration for the following reasons.

As a threshold matter, Applicant notes that the Examiner cited Parker generally without citing any particular portions of the reference or in relation to any of the elements of Applicant's claims. Regardless of this lack of specificity, Applicant believes that Parker does not anticipate the claims of the subject application, as is explained in the following remarks.

One requirement for a rejection under 35 U.S.C. § 102(b) is that the cited reference teach all the elements as arranged in the claim(s) at issue. In this situation, Parker fails to teach (or, for that matter, suggest) each of the elements in independent claims 1, 11, and 34, which are the base claims for the remaining claims subject to the rejection.

Amended independent claim 1, representative of the independent claims subject to the rejection, recites the following:

A laser system for destroying bacteria in a bacterial locale, said system comprising:

(a) a housing and a control system;

(b) a laser oscillator sub-system within said housing for causing the selective emission, under control of said control system, of first radiation in a first wavelength range of 865 nm to 875 nm and second radiation in a second wavelength range of 925 nm to 935 nm;

(c) an optical channel for transmission of said first radiation and said second radiation from said laser oscillator sub-system; and

(d) a head for enabling delivery of said first radiation and said second radiation from said laser oscillator sub-system through said optical channel to the site of said bacterial locale;

(e) wherein said first radiation and said second radiation are suitable to activate a chromophore at said bacterial locale to destroy bacteria in said bacterial locale.

[Emphasis added]

In contrast, Parker is directed to and teaches the use of a monitor including a light transmitter and a plurality of optical fibers positioned to transmit light to a body and a light detector including a plurality of light detector fibers. See, e.g., Parker, page 5, lines 19-25.

Parker teaches that the wavelength used in the transmitter fibers will generally be over a broad range of 500 nm to 1,100 nm and preferably in the range of 800 nm to 1,100 nm. See, e.g., Parker, page 6, line 30 through page 7, line 4.

Parker does not teach or suggest the specific narrow wavelength ranges or discrete wavelengths identified and claimed by the Applicant in the subject application. Moreover, Parker does not appreciate or recognize the advantages of utilizing the narrow NIR wavelength ranges and discrete wavelengths for causing photodamage in bacteria as claimed by Applicant .

Thus, Parker does not teach (or suggest) each and every limitation as arranged in claims 1, 9-11, 19, 20, 34, and 38-42, and therefore is an improper basis for a rejection of these claims under 35 U.S.C. § 102(b). Because of this, Applicant requests that the rejection of claims 1, 9-11, 19, 20, 34, and 38-42 under 35 U.S.C. § 102(b) be removed accordingly.

Claim Rejection – 35 U.S.C. § 103

Claims 1-4, 9-14, 19, 20, and 34-42

Claims 1-4, 9-14, 19, 20, and 34-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,669,466 to L'Esperance ("L'Esperance") in view the article by Neuman et al., "Characterization of Photodamage to Escheria Coli in Optical Traps," Biophy J. November 1999, pp 2865-2863, Vol. 77 ("Neuman").

As a prefatory note, claims 9, 19, 36, and 38-42 are canceled by the present amendment, rendering the rejection of them under 35 U.S.C. § 103(a) as moot.

For a rejection under 35 U.S.C. § 103(a), the cited reference(s) must teach or suggest each and every limitation in the claim(s) as issue. A further requirement necessary for a rejection under 35 U.S.C. § 103(a) is that proper motivation must exist to combine or modify the

reference(s) in the way proposed by the Examiner. As both requirements are not met in this situation, Applicant respectfully traverses the rejection and requests reconsideration.

Amended independent claim 1 amended (reprcsentative of the independent claims subject to the rejection) is set forth in the preceding section. Among other thing, Applicant's claims recite a laser system producing near infrared radiation at two specific and relatively narrow wavelength ranges, e.g., "a laser to cause the selective emission of first radiation in a first wavelength range of 865nm to 875nm and the selective emission of second radiation at a second wavelength range of 925 nm to 935 nm."

In contrast, L'Esperance teaches generally the use of a multi-beam laser system for application to an area of prospective surgical invasion of living tissue. Regarding the light produced by such a multi-beam laser system, L'Esperance teaches that such light: "(a) is of low intensity a tissue impingement and (b) is preferably in the visible or in the infrared."

One skilled in the art would understand that this broad and general description in L'Esperance of expansive portions of the electromagnetic spectrum fails to comprehend the significance, criticality, and unexpected results of the Applicant's claimed wavelengths and ranges, i.e., (i) 870nm and 930nm, and (ii) 865nm-875nm and 925nm-935nm. Moreover, L'Esperance characterizes its teaching as being directed to:

> laser-aseptic phototherapy, for enhanced sterilization of an area of prospective surgical invasion of living tissue, by first administering, intravenously, orally or otherwise as appropriate, a photosensitizing agent having the property, photosensitizing agent having the property, in the course of an acceptable period of time, of selective concentrated absorption in bacteria and other microorganisms such as those which exist at depth in hair follicles, and then, following lapse of the time period, applying laser irradiation to the area of prospective surgery, using a wavelength and power density selected for absorptive response by the photosensitive agent, whereby microorganisms are destroyed at and beneath the irradiated area.
>
> (L'Esperance, Abstract) [Emphasis added]

Thus, L'Esperance fails to comprehend the uniqueness of the Applicant's claimed wavelengths and ranges, i.e., (i) 870nm and 930nm, and (ii) 865nm-875nm and 925nm-935nm, and does not teach or suggest the use of such specific and narrow wavelength ranges for producing photodamage in bacteria.

For the foregoing reasons, L'Esperance fails to teach or suggest at least one limitation of claims 1-4, 9-14, 19, 20, and 34-42, e.g., energizing a laser to cause the selective emission of first radiation in a first wavelength range of 865nm to 875nm and the selective emission of second radiation at a second wavelength range of 925 nm to 935 nm.

The secondary reference, Neuman, teaches the use of various near infrared (NIR) wavelengths used in the study of the deleterious effects on bacteria isolated by so-called optical traps. The reference explores a range the use of a range of NIR wavelength at extremely high power densities, e.g., on the order of 1×10^7 W/cm^2, as typically used in such optical traps.

Like L'Esperance, Neuman also fails to teach or suggest at least one limitation of claim 21 and 22, e.g., using a laser to cause the selective emission of first radiation in a first wavelength range of 865nm to 875nm and the selective emission of second radiation at a second wavelength range of 925 nm to 935 nm.

Not only does Neuman fail to teach each and every limitation of the claims under rejection but the reference also teaches away from Applicant's claims (as well as the withdrawn claims), and thus there is no motivation to modify the references as proposed by the Examiner.

This is so as the Neuman reference actually teaches that the region between 870 nm and 910 "is particularly damaging and should be avoided, especially for work in vivo" and that 930 nm was "the most damaging wavelength" studied. [Emphasis added] See, e.g., Neuman, p. 2862 and p. 2859.

Thus, as L'Esperance and Neuman fails to teach each and every limitation of claims 1-4, 9-14, 19, 20, and 34-42 and further because at least one of these references teaches away from the Examiner's proposed modification, the cited references of L'Esperance and Neuman is an

improper basis for a rejection of claims 1-4, 9-14, 19, 20, and 34-42 under 35 U.S.C. § 103(a). Applicant requests the removal of the rejection accordingly.

Claims 7 and 17

Claims 7 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over L'Esperance in combination with Neuman as applied to claims 1-4, 9-14, 19, 20, and 34-42, and further in combination with U.S. Patent No., 6,475,138 to Schechter et al. ("Schechter"). Applicant traverses the rejection and requests reconsideration for the following reasons.

Claims 7 and 17 depend from claims 1 and 11, respectively. Amended claim 1, representative of the independent claims pending in the application, is set forth *supra*. L'Esperance and Neuman and their respective deficiencies relative to claims 1 and 11, as well as the teaching away present in Neuman in relation to Applicant's claims, are discussed *supra*.

The tertiary reference cited for the rejection, Schechter, teaches methods, apparatus, and sensors used for performing laser surgery such as myringotomy without the need for anesthesia. See, e.g., Schechter, col. 2, lines 8-19.

Schechter does not teach or suggest the specific narrow wavelength ranges or discrete wavelengths identified and claimed by the Applicant in the subject application. Regarding suitable lasers, Schechter teaches only that:

(A) helium neon lasers may be used for pilot lasers (see, e.g., Schechter, col. 10, lines 62-66);

(B) diode lasers can be used as aiming lasers (see, e.g., Schechter, col. 15, lines 11-12);

(C) surgical lasers utilizing CO_2 as the active medium (see, e.g., Schechter, col. 11, lines 55-56) may be used;

(D) surgical lasers utilizing Nd:YAG as the active medium may be used (see, e.g., Schechter, col. 11, lines 58-60); and

(E) surgical lasers utilizing erbium as the active medium may be used (see, e.g., Schechter, col. 16, lines 59-61).

None of the lasers taught by Schechter produce outputs in the narrow NIR ranges or values claimed by the Applicant in claims 1 and 11, the base claims for rejected claims 7 and 17 respectively. Moreover, while some diode lasers can (by virtue of careful selection of the semiconductor alloy constituents) be designed to emit radiation in the ranges and discrete values claimed by Applicant, Schechter does not appreciate or recognize the advantages of utilizing the narrow NIR wavelength ranges and discrete wavelengths to produce photodamage in bacteria, as claimed by Applicant. Thus, Schechter does not cure the deficiencies of L'Esperance and Neuman relative to the Applicant's claims.

For the foregoing reasons, the combination of L'Esperance, Neuman, and Schechter is an improper basis for a rejection of claims 7 and 17 under 35 U.S.C. § 103(a), and Applicant requests that the rejection be withdrawn accordingly.

Claims 8 and 18

Claims 8 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over L'Esperance in combination with Neuman as applied to claims 1-4, 9-14, 19, 20, and 34-42, and further in combination with U.S. Patent No., 6,454,791 to Prescott ("Prescott"). Applicant traverses the rejection and requests reconsideration for the following reasons.

Claims 8 and 18 depend from claims 1 and 11, respectively. Amended claim 1, representative of the independent claims pending in the application, is set forth *supra*. L'Esperance and Neuman and their respective deficiencies relative to claims 1 and 11, as well as Neuman's teaching away from Applicant's claims, are discussed *supra*.

The tertiary reference cited for the rejection, Prescott, teaches methods and apparatus utilizing vertical cavity surface emitting lasers ("VCSELs") for low level light therapy of skin ulcers such as those that commonly afflict diabetics. See, e.g., Prescott, col. 4, lines 23-44. Prescott teaches that VCSELs according to its disclosure emit outputs over a broad range of 400

nm to 1,300 nm and preferably in the range of 760 nm to 850 nm. See, e.g., Prescott, col. 8, lines 13-18.

Prescott does not teach or suggest the specific narrow wavelength ranges or discrete wavelengths identified and claimed by the Applicant in the subject application. Moreover, Prescott does not appreciate or recognize the advantages of utilizing the narrow NIR wavelength ranges and discrete wavelengths for causing photodamage in bacteria as claimed by Applicant. Thus, Prescott does not cure the deficiencies of L'Esperance and Neuman.

For the foregoing reasons, the combination of L'Esperance, Neuman, and Prescott is an improper basis for a rejection of claims 8 and 18 under 35 U.S.C. § 103(a), and Applicant requests that the rejection be withdrawn accordingly.

Conclusion

Applicant submits that the claims pending in the subject application are allowable and respectfully requests a Notice of Allowance for the application. Please charge any fees that may be due, or credit any overpayment, to Deposit Account Number 50-1133.

The Examiner is invited to telephone the undersigned attorney to discuss any aspect of this application or this response.

Respectfully submitted,
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